ABSTRACT

Background: The reasons for the mixed evidence of the effectiveness of school-based physical activity programs can be many, including implementation challenges. Studying program implementation can potentially contribute to enhancing effectiveness, the design of future interventions, improved implementation and the interpretation of outcomes. Methods: For this process evaluation, individual interviews were conducted with 16 teachers who had implemented the program “Active All Year Round” in a fifth-grade school class (9-11 years) in 2017. Through systematic text condensation feasibility and barriers of program implementation, perceived program reach and the programs’ influence on social cohesion were identified and discussed. Results: Teachers described the program as very feasible to implement and identified very few implementation barriers, the most prominent being time constrains. Perceived program reach was very high and teachers reported that those students who are less confident when it comes to physical activity did not have differential participation than those feeling more confident about physical activity. Finally, the program was perceived to positively affect social cohesion in class. Conclusions: Active All Year Round is a standardized, flexible and easily implemented program in Danish schools. Future studies are needed to study implementation from a student perspective and/or the students’ roles and experiences with health programs which include a competition component.
Studies on the effectiveness of physical activity interventions in school have shown partly positive\textsuperscript{1,2} but also non-significant findings\textsuperscript{3-5}. Several factors may explain this inconsistency since theoretical approach, content, duration, intensity, didactical approach and quality of implementation differ. An essential prerequisite for program effectiveness is successful implementation but it is not uncommon that teachers encounter barriers in trying to integrate health promotion activities into their curricular routines. In particular implementation of comprehensive and multi-dimensional programs might not always be deemed fully feasible\textsuperscript{3}, indicating a need for less time demanding and more flexible programs. In a review of factors influencing implementation of school-based physical activity interventions, Naylor et al.\textsuperscript{6} found that lack of time was the aspect most often identified as a barrier to implementation while availability/quality of resources, supportive school climate, contextual appropriateness, training/workshops and technical support from program staff and teacher self-efficacy were found to be important facilitators.

A particularly important aspect of implementation quality is whether or not all students in class are actually reached by the program. There has been a longstanding concern in health promotion research that reach of health promotion programs often may be higher for those in lesser need of support than those in higher need\textsuperscript{7}. In a school setting, such inequality becomes evident when schools with a higher proportion of children from lower socio-economic backgrounds are less likely to engage in health promotion activities than schools with a higher percentage of children from high socio-economic backgrounds\textsuperscript{8}. On the other hand, it may be argued that once schools do participate, they are targeting the class as a whole, regardless of socio economic status of individual children\textsuperscript{9}, thus the concern of not targeting the population segments in greatest need of health promotion initiatives, might be somewhat less justified in a school setting. Differences may be more subtle though, since reach does not only involve formal participation but also active engagement with a program. Thus, there is a risk of reaching primarily the children who are more experienced in and more enthusiastic
about physical activity in the first place. It is therefore important to uncover, if all children do in fact participate equally in school-based physical activity programs despite initial differences. This is particularly the case for programs where performance and achievement is prominent, such as in school competitions where school classes compete for prizes by performing health related activities. Effectiveness of the competition approach has mostly been documented in the area of smoking prevention, but some evidence exists also in the area of healthy eating and physical activity\textsuperscript{10}. An advantage of this approach is that it can motivate some children but may also lead to disengagement by those children who might not like competitions, either because they have an unfavorable self-concept regarding their abilities, because they don’t like to lose, or fear possible reprisals from peers or teachers. Also, there can be a concern about children feeling pressured about their performance by comparing themselves with peers, which may negatively affect the social climate in class.

This paper is a part of a broader study “Physical Activity Competition Evaluation - Denmark” (PACE – Denmark) and reports findings from a process evaluation of a national school-based competition program aimed at promoting physical activity in Denmark. The study was conducted from a qualitative perspective in order to understand the teacher’s experiences and beliefs about the Active All Year Round (AAYR) program. In recent years more focus has been given to the benefits of using qualitative approaches to study program reach\textsuperscript{11}, as opposed to the quantitative methodology traditionally used\textsuperscript{12,13}, since a qualitative approach can provide a more detailed, nuanced and deeper understanding of participants’ actual active participation and engagement. The teachers’ perspective is important in the given context as teachers not only have detailed inside knowledge about the implementation of the program, but they are the ones who need to be motivated to invest in proper program implementation. The purpose of this study is to contribute with new knowledge about how teachers perceive the implementation of a campaign-based physical activity competition program regarding the following questions:
a) How feasible is it for the teachers to implement a physical activity competition program and which barriers might hinder implementation?

b) What is the program reach in terms of students’ active participation and engagement? In particular, do teachers perceive different participation in those students who are less confident when it comes to physical activity than those feeling more confident?

c) Do teachers observe negative effects on social cohesion in class due to the competition program?

METHODS

A qualitative approach was used to identify teacher perceived program reach and factors influencing the implementation of the Active All Year Round (AAYR) program in 2017. The intervention program, participants, procedures and data analysis will be presented in the following.

The intervention program

The AAYR program is a 3-week-long free program which has been offered annually to all Danish school classes since 2006 by University College South Denmark\(^1\). 354,543 primary and secondary-level schoolchildren were signed up by their teacher, representing 53% of all schoolchildren in Denmark\(^1\). The program is competition-based where school classes compete to be the most active class in the country by mainly performing classroom-based physical activity, but it also contains some elements of promoting nutrition and sleep. The core of the AAYR program focuses on activities at school, but some outside activities are included, such as active transportation to and from school and being active with ones’ family. Each year a different small physical activity device is provided for each student, such as a frisbee in the 2017 program. Program material is meant to be adaptable to the local setting, make up only a part of the teaching lessons within the three weeks. Program exercises

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\(^1\) The Active All Year Round program in 2017 was funded by the Danish Nordea-Fonden.
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do not replace academic teaching and can be used separately or in combination with academic content.

For more information about the program, see appendix A.

Participants

One fifth-grade school class (students 9-11 years of age) from each of sixteen different schools and their teacher who had implemented the 2017 program participated in the PACE – Denmark study. As this qualitative investigation was part of a larger study, which also encompassed a quantitative approach, and the different types of data were collected from the same school classes, schools were selected by cluster randomized sampling, stratifying for region/urban-rural areas and educational background of parents. As shown in table 1, the majority of participating teachers had 10 or more years of teaching experience, had participated in the AAYR program before and had participated in other school-based health programs before. Around half of the participants had undergone further education about physical activity. Schools were evenly geographically distributed across Denmark, and more than half were situated in rural areas.

Procedure

The study used semi-structured face-to-face interviews as method of data generation. The interview guide was piloted with three teachers from different schools (not included in the study) after the 2015 program. In the study we draw on the phenomenological approach with a focus on subjectivity and on the experiences and meanings attributed by the studied subjects. We as researchers have put our own experiences and preconceived assumptions about the studied phenomenon aside, in order keep an open mind and give voice to the studied subjects. Thereby, an understanding of the meanings attributed, and perspectives held by the teachers was facilitated.
Interviews ranged from 30 to 60 minutes in length and were mostly conducted at the schools in November/December 2017, four to eight weeks after program completion. All interviews were digitally recorded, and teachers’ names were replaced by pseudonyms. Interviews were transcribed verbatim and analyzed with the help of the data analysis software program NVivo 11.

The study adheres to Danish standards for ethical conduct of scientific studies. All teachers were informed that data would be presented in a completely anonymized form. Teachers were informed that their participation was voluntary and gave oral consent.

Data analysis

Data were analyzed using systematic text condensation\(^6\). In the first reading we got an overview of the total material, got familiar with the material and established the preliminary themes. Thereafter we read our transcripts line by line to sort the meaning units and identify the codes, which we grouped and altered underway. Thirdly, we systematically extracted the meaning from the codes and the material was condensed to several subgroups. We reached consensus of content and labels and the themes were checked by two researchers for reliability. Finally, we reconceptualized data, made sure that data were fairly presented and developed category headlines for the most prominent domains of our findings\(^6\).

RESULTS

Feasibility and barriers of implementation

The main topic teachers described regarding the feasibility of the program was, that it is a flexible program with no need for cooperation with others, and the main barrier was time constraints.

Flexible program with no need for cooperation with others. That teachers could and did implement the program independently not needing to cooperate with other teachers or to involve the school
principal, was for most teachers important for the feasibility of program implementation. Many
teachers like Per described how the principal was unaware of the school class’s participation in the
program:

“I would go to my principal if I had problems…[…]…But something like this [the program]
which is a concept that runs itself and is based on something positive – we do that ourselves”.

This lack of need of principal involvement was perceived as positive since teachers then had a
greater degree of freedom in their teaching. The program is initiated bottom-up as the teachers
themselves sign up their school classes. Teachers explained that they took sole responsibility for
implementation, allowing the program to be implemented in a tight teaching schedule.

The program is designed so teachers can choose which program components to work with and
to what extent. The teachers experienced this flexibility as an advantage allowing for easy program
implementation adaptable to the setting. Some teachers used a minimum of the program elements
where others used all material and planned for the program ahead, incorporating it in their plan for
the school year and combining it with broader health themes. As Anja described:

“We had something about the body and health and physical activity and things like that, at the
same time.”

Some teachers, like Karen, extended the theme beyond the program weeks. Karen had talked
with her students about health when working with the program scorecards (where students’ individual
daily health performances were disclosed) and thereby had identified health challenges in some of
her students. Therefore, she called in a school nurse after the program ended.

In sum, teachers experienced it to be very feasible to implement the program, because of the
flexibility of the program and possibility for implementation independent of others.
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**Time constrains.** Even though many expressed that the material was so easy to work with that a minimum of preparation time was needed for the teacher, lack of preparation time was still a barrier for some, like Henrik who did not believe that the time he spent on preparing the program was well spent: “I have a greater need of preparing the academic content”.

Further, teachers expressed that it was difficult to manage the program in addition to the set curriculum and many new policy regulations and initiatives coming from management and the government. As a solution to this time problem some teachers, who were having time difficulties fitting the program into the class schedule, appeared to adapt the program to fit with the academic theme which they were working on at that time. Bente explained how she cannot fill her lessons with things not related to the academic content:

“Timewise I needed to do some of the things I was working on, instead of adding something completely new. And yes, I could have said that, now we will just go down and have fun and do some of these exercises. I just didn’t think we had the time for that.”

Further, using the modified program material to teach academic content is one of many didactical approaches the teachers use to make knowledge accessible to their students and thereby reach the students who benefit from more active learning styles. Finally, Peter highlighted another aspect since he experienced, that most of the students did not notice that the modified frisbee exercises included academic content and they were more engaged in the teaching.

Thus, we found that two dimensions of time influenced the implementation; the lack of preparation time for the teacher and difficulties fitting the program in the academic class schedule. However, teachers compensated for this lack of time to introduce a new and non-academic program by adding the program material to their own academic content.
Program reach: Active participation and engagement

High inclusion but different engagement. Except from a few teachers who expressed that, as in most teaching, not all students were equally engaged in the program, teachers in general experienced that almost all students could and did participate in the program exercises. As Susanne expressed:

“You would have to have anxiety or be challenged in other ways if you do not embrace a project like this”.

Several teachers believed that since the program activities were so easy to perform, everyone who wanted to participate could participate, as explained here by Karen:

“Everyone participated. The exercises are on a level where everyone can participate. There are no difficult rules and they don’t have to engage in complicated collaborations with others.”

Below, Mike explained how he, like most teachers, experienced that even the students who in general had health challenges or difficulties with being physically active happily participated in the program:

“If you think about such factors as being overweight and other things, I don’t feel that anyone did not participate because of something physical. It was more those who just thought that they didn’t bother to participate.”

Overall the teachers could not pinpoint any specific characteristics of the students who were less engaged in the program. On the contrary, some teachers were positively surprised to see how those among their students who were insecure when it came to physical activity actually broke out of that insecurity and participated in the program elements, as told here by Lars:

“There were some of those…[…]…kind of insecure kids who wouldn’t get up in front of a big crowd and dance to this music video, but when we all did it in between each other they got
That teachers perceived a high program reach since almost all students participated in the program indicates that no subgroups were missed in these schools and that the program is able to also reach the students most in need of health promoting initiatives. In sum, those students who were less confident when it comes to physical activity did not participate less than those more confident.

Influence of the program on social cohesion in class

The teachers’ experiences of how the program influenced social cohesion in class were grouped in the following categories: “Changed social relations” and “Being put on the spot?”.

Changed social relations. Several teachers reflected upon that participation in the program helped students to interact in different ways with their class peers than before and these differences were actually positive ones:

“I think it also gives some interconnectedness in the class. That it is some activities we do together.”

Further, the interview extract below, where a teacher explained what it did to the class when the children performed the group activities, demonstrates how the program can be used to change the established relationships which exist in the class:

“They have been forced to uhm, relate to everyone…[…]…we have sort of broken down some of the groups which can be in the class. Because everyone has been a part of some common activities, in a common cause. But I think we do that in many things and try to do that all the time. The campaign can also help with getting a better social life in the class.”
This experience highlights how the students, by working with the program exercises, can relate to each other in new and different ways. So, it seems that an indirect benefit of the program can be that the students may change their interactions with each other and create new social relationships which can increase the groups’ cohesiveness\(^1\).

**Being put on the spot?** Working with the individual scorecard of the program requires individual transparency about the students’ performances. Students must share their scorecard results in class in order for an average score to be calculated for the school class, adding to the chance of winning a class prize. This could potentially lead to negative social comparison processes or social competition within the class. The large majority of teachers reported no problems with this, however one teacher experienced, that when some of her students had not performed the daily health activities, they were negatively exposed in class. Thereafter she discharged using this competition related program component and thereby adjusted her usage to make it fit with her class context. Another teacher, Karen, explained how she did not encounter any negative experiences with the individual scorecard:

> “There are some families who do not support things like these, right? But I think the good thing is, that it doesn’t matter so much. They don’t get exposed. They can still participate on equal terms with the others.”

After the students’ individual performances had been presented in class, Karen talked about the emerged themes, such as the importance of being physical active, in general with her school class, thus shifting the focus from the individual student to the school class in general.

Another aspect of how the program did not expose the children negatively was explained by Lea. She pinpointed how doing the frisbee exercises could help level out the differences of the children’s skills of physical activity when they were being physically active:
“You can say that the ones who do not do much sport and are a bit chubby, they have experienced that they have been on the same level as those damned soccer-guys and gymnastics-princesses. They have had the same starting point of being either really good or really miserable at throwing that one [frisbee]. So at least no one has left there thinking “oh my goodness now I’m also bad at throwing a frisbee”, because we were all bad at that.”

Even further, another teacher Bente, used the frisbee exercises in the subject English to disguise academic mistakes the children made:

“…it has been easier to yell out an English word and then throw it [the frisbee]. If I want to say blue and I say “blu” [pronounces it wrong], then the others have forgotten it when I have thrown this. So, you can camouflage these things which you are not so strong at.”

For Bente the program worked as a facilitator of reaching the students who were having academic difficulties.

Thus overall, several teachers perceived the program to affect social cohesion in class positively, with only one teacher experiencing the opposite.

DISCUSSION
This study used an in-depth qualitative approach to identify a) how feasible implementation was for teachers and which barriers might hinder implementation of a campaign-based physical activity school competition, b) teacher perceived program reach of participation and engagement, in particular possible differential participation of those students who are/are not more confident when it comes to physical activity and c) if the program negatively affected social cohesion in class. In the following section some of the main findings will be discussed.
Feasibility and barriers of implementation

In accordance with previous research\textsuperscript{18,19}, we found the flexibility of the program to be of importance when it came to perceived feasibility of implementing the program. On the one hand, the program is quite standardized and readymade for use. However, it is at the same time designed to allow for implementation adaptable to the local setting. Data showed that the teachers did adapt the program to fit with their schedule and situation, making it feasible to implement the program in many different situational contexts.

Lack of time was the barrier most consistently identified in a review of studies of implementation of school-based physical activity interventions\textsuperscript{6}, however, in our study only a few teachers identified lack of preparation time as a barrier. Reasons for why the majority of our participants did not raise this issue, could on the one hand be rooted in the relative simplicity and flexibility of the AAYR program which offers ready-made components not requiring much preparation. On the other hand, it cannot be excluded that the group of teachers interviewed in the present study, was selective in that they may have represented a particular motivated group choosing to prioritize and implement the program, despite of time issues, since they found the program to be of importance. Further research is needed to pursue these possible mechanisms. However, it also needs to be noted that some teachers did experience time barriers. In these cases, lack of time might have affected level of or quality of implementation, rather than whether they choose to implement the program at all. Consistent with other studies\textsuperscript{20,18} we also found that including the program in an already tight class schedule was perceived as a barrier for implementation by many. In line with the findings of McMullen, Kulmina & Cothran\textsuperscript{21}, we also found that in order to deal with this problem, many teachers as explicitly suggested by the program, combined the program elements with their academic teaching, i.e. used the physical activity games as a means to “transport” academic content. In this way teachers could justify spending time on the program despite having an already full class schedule. Although the
evidence is scattered\textsuperscript{22,23}, some studies show that curriculum focused active breaks improves academic outcomes\textsuperscript{24,25}, thus teachers combining the physical exercises in the AAYR program with academic content may have positively affected the quality of the teaching.

Some teachers combined the program with academic content as a didactical approach to reach students who struggle academically or to engage students more and experienced that approach as very successful. Watson et al\textsuperscript{24} have previously found evidence for a relative consistent positive association between classroom-based physical activity and on-task engagement, even though further research is needed to confirm if this strategy is indeed effective long-term.

**Program reach: Active participation and engagement**

The AAYR program has a high uptake among the schools perhaps because it is a standardized, free and easy to implement program. An important finding in our study was that teachers experienced that almost all students could and did participate in the program. Not all students were equally engaged in the program activities, but there was no indication that certain subgroups were systematically excluded from the activities and the teachers further emphasized that the students who were normally less physically active appeared to be reached by the program. In general, health promotion programs have been criticized of reaching those in lesser need of support\textsuperscript{7}. In their review of school-based health behavior interventions, Moore et al.\textsuperscript{26} identified, that interventions based on education only, not including the environment and/or family/community, may be more likely to widen inequality. A valuable finding in our study is, that for the AAYR program, also those most in need participated and thereby have the possibility of profiting from the program.

**Influence of the program on social cohesion in class**

Generally, our study indicates that school-based physical activity interventions can also provide social benefits for the school class. Previous research has identified different typologies of active or passive school recess behavior\textsuperscript{27}, revealing how some groups of children felt limited in their recess activities
because of a skilled-based power hierarchy among the children which seemed to structure the children’s play. In our study, teachers experienced that since all students could participate on equal terms, a program like AAYR can change the social roles of the students allowing for the students to break out of these typologies and to some extent change the established hierarchy in class. Through the program the students may see each other in a new way and create new constellations in the class, which can facilitate a new balance of power in the classroom. Previous research has found that adding a competition element to a program may also potentially expose children negatively or lead to conflict in class due to different capabilities of the students. In our study we found only little confirmation for this since only one teacher had this experience of exposing the children negatively. However, it could be interesting for future research to explore this phenomenon from a student perspective. Our findings also suggest that teachers can reduce potential negative exposure by shifting the focus from the efforts of the individual to the group. This was done by relating the individual contributions to talks about health differences in general.

Limitations

Despite the random selection of participating schools, it cannot be disregarded that the teachers who agreed to participate in the interview study may have felt more positive about the program than the ones who rejected participation. Teachers who experienced more difficulties in implementing the program may have declined being interviewed which could have led to selection bias and an underestimation of implementation problems. Further, the teachers may have been overly positive due to social desirability tendencies in the interview situation and could have reported more positive student participation and fewer barriers, possibly affecting the validity of the findings. However, the teachers were informed that it was important for the study that they spoke absolutely freely and were assured absolute confidentiality, which may have limited this type of bias. In relation to concerns about external validity, it needs to be pointed out that in general in Denmark many teachers are
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experienced in conducting classroom-based physical activity and therefore may have seen less barriers in implementing such a program than would be the case in countries where such experiences are less common. Finally, a limitation of this study is that we have not included the viewpoint of the students. It could be questioned, how well the teachers’ perceptions reflect students’ active engagement in the project. However, it can also be argued that these teachers in general know their students since they teach them in numerous subjects and have been able to closely observe the students’ behavior and their attitudes in relation to the program.

Conclusion

Based on the study conducted, it can be concluded that teachers were very positive with regard to the feasibility of program use and identified only few barriers to implementation. Teachers perceive the Active All Year Round (AAYR) program to reach the large majority of students and that those students who are less confident when it comes to physical activity did not have differential participation than those feeling more confident about physical activity. The program was user-friendly, and, in some cases, positively affected social cohesion in class.

Future research could build upon our results and explore implementation from the students’ perspective. Specifically, the phenomenon of the competition component could benefit from in depth qualitative investigations of students’ roles and experiences. Further, research is needed to reveal any possible influence of the background of the students, or their influences from home and their everyday life on their participation in health programs such as the AAYR program.

ACKNOWLEDGEMENTS

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REFERENCES


Table 1 Characteristics of Schools and Interviewed Teachers (n=16)

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Schools:

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